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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/762,952

01/22/2004

Robert Vincent

BOW1335-047

5966

45684

7590

04/29/2008

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EXAMINER

RIGGS II, LARRY D

ART UNIT

PAPER NUMBER

1631

MAIL DATE

DELIVERY MODE

04/29/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/762,952	VINCENT, ROBERT	
	Examiner	Art Unit	
	LARRY D. RIGGS II	1631	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 14 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 and 94-111 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 94-111 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's amendments and request for reconsideration filed 14 December 2007 are acknowledged and entered.

Drawings

The drawings filed on 14 December 2007 are acknowledged. In view of the petition decision mailed 1/18/08, the color drawings are accepted.

Status of Claims

Claims 1-19 and 94-111 are currently pending and under consideration.

Withdrawn Rejections/Objections

The objection to the drawings in the Office action mailed 12 June 2007 is withdrawn in view of the drawings filed 14 December 2007.

The objection to claim 17, in the Office action mailed 12 June 2007 is withdrawn in view of the amendments filed 14 December 2007.

The rejection of claims 1-50 under 35 U.S.C. 112 2nd, in the Office action mailed 12 June 2007 is withdrawn in view of the amendments filed 14 December 2007.

Claim Objections

Claims 94 and 100 are objected to because of the following informalities:

The MPEP section 608.01(m) states:

While there is no set statutory form for claims, the present Office practice is to insist that each claim must be the object of a sentence starting with "I (or we) claim," "The invention claimed is" (or the equivalent). If, at the time of allowance, the quoted

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terminology is not present, it is inserted by the Office of Patent Publication. Each claim begins with a capital letter and ends with a period. Periods may not be used elsewhere in the claims except for abbreviations. See Fressola v. Manbeck, 36 USPQ2d 1211 (D.D.C. 1995). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation, 37 CFR 1.75(i).

In the instant case, claim 94 contains a period at the end of step a) and at the end of step c).

Further, claim 94 provides "said coliformin said water" in line 1 of step c). It is suggested that applicant add a space such as "said coliform in said water" to result in grammatical correctness.

Claim 100 provides a break in the sentence of line 2 that is not necessitated by a new step in the method. It is recommended that applicant rejoin line 2 at "E. coli." with "correlates" to not add confusion to the procession of the claim.

Appropriate correction is required.

Specification

The abstract of the disclosure is objected to because it does not reflect the entirety of the invention. Particularly the abstract does not discuss detecting Escherichia Coli bacteria from reflected light. Correction is required. See MPEP § 608.01(b).

The disclosure is objected to because of the following informalities:

In the specification, page 2, paragraph 4, regarding the phrase "to be able to be able to detect" applicant should remove "to be able" for grammatical correctness.

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Method of Detecting Coliform Bacteria and Escherichia Coli Bacteria from Reflected Light.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-19 and 94-111 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "said respective amounts of light" in lines 2-3 of step b). There is no clear antecedent basis for the limitation because only a single respective amount of light was provided previously in step a) of the instant claim.

Claim 2 recites the limitation "the visible-reflective IR range" in line 2. The metes and bound of the limitation are unclear. Neither the claim or specification provide a clear and precise definition of said limitation. One skilled in the art would be uncertain if "IR" represents infrared and if so, does the visible-reflective IR range encompass all wavelengths in the visible spectrum and infrared spectrum? It is unclear what range of wavelengths the limitation refers.

Claim 3 recites the limitations "one of said light measurements", "a second of said light measurements" and "the third of said light measurements" in lines 3-5. There is no clear antecedent basis for the said limitations because claim 1 only provided "a

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single measurement of the respective amount of light” in line 2 of step a), not a second or third measurement of light.

Claim 4 recites the limitation “the detectable range” in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 6 in lines 1-2 and claim 17 in lines 6-7 of step b), recite the limitation “any algorithm selected from the group consisting of: $X = K1 + K2 \times (R32) + K3 \times (R43)$ ”.

The metes and bounds of the limitation are unclear because there is no “group” of algorithms upon which one skilled in the art would select from, only one algorithm.

Likewise, it is unclear if (R32) is multiplied by K2 or the sum of K1+K2. Further, it is unclear if (R43) is multiplied by K3 or the sum of K3 and (R32).

Claim 6 recites the limitation “K1 is a value in the range of from about -175 to about -350; K2 is a value in the range of from about 250 to about 350; K3 is a value in the range of from about 200 to about 350” in lines 4-6. Claims 7, 8, 17, 98-100 and 107 recite similar enumerated ranges with unknown units. The metes and bounds of the limitation are unclear as to what each enumerated range represents. One skilled in the art would not know what units to apply to said ranges.

Claim 9 in line 2, claim 10 in line 2, Claim 11 in line 2 and claim 12 in line 2, recite the limitation “the actual measured amount of said coliform”. There is no clear antecedent basis for the limitation because claim 1 does not provide an “actual measured amount of said coliform”. Claim 1 only provides “a measurement of the respective amount of light” in line 2 of step a), then a subsequent determination of “the approximate amount of said coliform” in line 1 of step b).

Claim 9 in lines 2-3, claim 10 in lines 2-3, claim 11 in lines 2-3, claim 12 in lines 2-3, claim 101 in lines 3-4, claim 102 in line 3, claim 103 in line 3, claim 104 in line 3 recite the limitation "correlation value in excess of 60%, 70% or 80%, respectively. The metes and bounds of the limitation are unclear. Neither the specification nor the claims provide a clear and precise definition of correlation value. One skilled in the art would understand that a calculated value and a measured value could be correlated, however it is unclear what a correlation value is and how an excess in percentage applies to the correlation value and respective calculated and measured values.

Claim 11 in line 1 and claim 12 in line 1, recite the limitation "according to claim 5, the calculated value of X". There is no clear antecedent basis for the limitation because neither dependent claim 5 nor claim 1 provides a "calculated value of X".

Claim 15 in line 3, claim 16 in line 3 and claim 19 in line 3, recite the limitation "the site where said measurement takes place". There is insufficient antecedent basis for this limitation in the claim.

Claim 17 recites the limitation "in at least three frequencies comprising, respectively: (i) LANDSAT TM band 2..." in line 2-3 of step a). The metes and bounds of the limitation are unclear. In lines 4-6 of step b) recites "at least three wavelength ranges". Previously in claim 5, a measurement of an amount of light in at least three wavelength ranges was taken with sensors such as LANDSAT TM band 2. Likewise, the specification, page 22, paragraph [0068], refers to LANDSAT Thematic Mapper (TM) as a sensor that has spectral bands (encompassing numerous wavelengths). One

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skilled in the art would be unclear whether applicant intended to make a measurement at "three frequencies" or "three bandwidths".

Claim 17 recites the limitation "said respective amounts of light" in lines 2 and 5 of step b). There is no clear antecedent basis for the limitation because only a single "measurement of the respective amount of light" is recited in line 2 of step a).

Claim 94 in lines 2-3 of step c), claim 96 in lines 1-3 of step b), claim 110 in lines 2-3 of step c), recite the limitation "said respective amounts of light". There is no clear antecedent basis for the limitation because only "a measurement of the respective amount of light" is provided in line 2 of step a), respectively.

Claim 98 in lines 2-3, claim 107 in lines 5-6 of step b), recite $X = K1 + K2 \times (R42) - K3 \times (R52) + K4 \times (R54)$ ". The metes and bounds of the limitation are unclear because it is unclear if (R42) is multiplied by K2 or the sum of K1 and K2, likewise does (R42) subtract K3 or the product of K3 and (R52), etc. One skilled in the art would be unclear what the relationship between parameters of the algorithm is.

Claim 101 in line 3, claim 102 in line 2, claim 103 in line 2, claim 104 in line 2, recite the limitation "the actual measured amount of said E. coli.". There is no clear antecedent basis for the limitation because claim 96 does not provide an "actual measured amount of said E. coli." Claim 96 only provides "a measurement of the respective amount of light" in line 2 of step a), then a subsequent relating of "the approximate amount of said E. coli." in line 1 of step b) by an algorithm.

Claim 103 in lines 1-2, claim 104 in lines 1-2, recite the limitation “according to claim 100 wherein the calculated value of X”. There is insufficient antecedent basis for the limitation because claim 100 does not provide for a calculated value of X.

Claim 105 in line 3, claim 106 in line 3, claim 109 in lines 3-4, recite the limitation “the site where said measurement takes place”. There is insufficient antecedent basis for the limitation because claim 96 does not provide a site where a measurement takes place.

Claim 107 recites the limitation “in at least three frequencies comprising, respectively: (i) LANDSAT TM band 2...” in line 2-3 of step a). The metes and bounds of the limitation are unclear. In lines 3-4 of step b) recites "at least three wavelength ranges". The specification, page 22, paragraph [0068], refers to LANDSAT Thematic Mapper (TM) as a sensor that has spectral bands (encompassing numerous wavelengths). One skilled in the art would be unclear whether applicant intended to make a measurement at "three frequencies" or "three bandwidths".

Claim Rejections - 35 USC § 101

The previous rejection under 35 U.S.C. 101 is maintained and reiterated.

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-19 and 94-111 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The claims are drawn to a process of determining an amount of coliform or E.coli bacteria in water from measured reflected-light off water.

Since the claimed invention involves mathematical algorithm, which is a judicial exception, the following analysis of facts of this particular patent application follows the rationale suggested in the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (OG Notices: 22 November 2005, available from the US PTO website at

<http://www.uspto.gov/web/offices/com/sol/og/2005/week47/og200547.htm>).

The Guidelines states:

To satisfy section 101 requirements, the claim must be for a practical application of the § 101 judicial exception, which can be identified in various ways (Guidelines, p. 19):

- The claimed invention "transforms" an article or physical object to a different state or thing.*
- The claimed invention otherwise produces a useful, concrete and tangible result.*

In the instant claims, there is no physical transformation by the claimed invention because the invention provides obtaining a measurement of reflected light at various wavelength ranges and using an algorithm to determine or relate an approximate concentration of bacteria in the water with an algorithm, thus the Examiner must determine if the instant claims produce a useful, tangible, and concrete final result. Note that at least for one embodiment, "obtaining measurement" can be obtaining measurement data in a computer system.

In determining if the instant claims have a useful, tangible, and concrete final result, the Examiner must determine each standard individually. For a claim to be “useful”, the claim must produce a final result that is specific, substantial and credible. For a claim to be “tangible”, the claim must set forth a practical application of the invention that produces a real-world final result. For a claim to be “concrete”, the process must have a final result that can be substantially repeatable or the process must substantially produce the same result again. Furthermore, the claim must recite a useful, tangible, and concrete final result in the claim itself, and the claim must be limited only to statutory embodiments. Thus if the claim is broader than the statutory embodiments of the claim, the Examiner must reject the claim as non-statutory.

Method claims 1-19 and 94-111 do not produce a tangible final result. A tangible requirement requires that the claim must set forth a practical application of the measured light (data) and the determined approximate amount of bacteria (data), to produce a real-world result. The instant claims are drawn to a method of determining an amount of bacteria. However, the last step of the claims only includes the determining an amount of bacteria, the result of the invention is a set of data, which, in itself, is not tangible. Since the claim itself must include a useful, concrete and tangible final result, the instant claims are non-statutory.

This rejection could be overcome by amendment of the claims to recite that a specific final result of the process is outputted to a user, or by including a result that is a physical transformation. It is noted that claims 13-14, 18, 95 and 108 result in the generation of a report, but it is unclear whether a user would have access to said report

or if the report (more data) is stored in a server, database, etc. The applicants are cautioned against introduction of new matter in an amendment.

Response to Arguments

Applicant's arguments filed 14 December 2007 have been fully considered but they are not persuasive.

Applicants argue the invention as claimed does lead to a tangible result as it allows the user of the method to detect the presence of coliform bacteria in water by remote means. Applicant argues that the invention is not merely an algorithm or series of mental steps. Applicant argues that claims of similar form have been issued by the Office with the basic structure of a) a measurement of a physical phenomenon, then b) a determination of an amount.

This is not found persuasive.

Applicant's claims as written do not provide a tangible result to a user by a remote means or any other means. Applicants merely obtain data (obtaining measurement) and use an algorithm to provide more data. In some dependent claims, e.g. claim 109, the produced data is sent to a remote location. In independent claim 110, the measured light (data) is sent remotely to determine a different set of data. None of the claims ensures that a user can have access to the data, i.e. amount of bacteria in the water.

Each of the Previous issued patents by the Office was examined on its own merits. Applicant has not established that there is a nexus between the fact pattern and claimed subject matter in the previous issued patents and those in the instant claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Claims 1-5, 94, 96, 97, 105, 109 and 110 rejected under 35 U.S.C. 102(a) as being anticipated by Turdukulov (Masters Thesis, International Institute for Geo-Information Science and Earth Observation Enschede, The Netherlands), 2003, 1-78.

The instant claims provide a method of determining the presence of coliform bacteria in water from light reflected therefrom, said method comprising the steps of:

(a) obtaining a measurement of reflected light from said water, said measurement comprising a measurement of the respective amount of light in at least three wavelength ranges (i) from about 0.53 μm to about 0.60 μm ; (ii) from about 0.63 μm to about 0.69 μm ; and (iii) from about 0.76 μm to about 0.90 μm ; and

(b) determining the approximate amount of said coliform in said water from said respective amounts of light by applying an algorithm relating said respective amounts of light in said at least three wavelength ranges to the amount of coliform bacteria in said water.

Regarding claims 1, 2, 5, 96, 97 Turdukulov shows measurement of reflected light from water over wavelength ranges of 500-800 nanometers (page 62, Appendix B) and shows organic suspended matter (OSM) concentrations, that includes pathogenic

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bacteria, such as coliform and E.coli, (page 2, 14, 67, Figures 2.5, D4; Jamieson et al. below).

Regarding claim 3, Turdukulov shows the relationship between total suspended matter (TSM) and volume of reflectance is a linear relationship, wherein $OSM (mg/l) = TSM - ISM$ (inorganic suspended matter), (pages 2, 11-12, Equations 2.1 and 2.2).

Regarding claim 4, Turdukulov shows measurement of reflected light from water over wavelength ranges of 500-800 nanometers (page 62, Appendix B; Thorlabs DET110 silicon detector, below).

Regarding claim 94, 105, 109 and 110, Turdukulov shows measurement of reflected light from water over wavelength ranges of 500-800 nanometers (page 62, Appendix B) and shows organic suspended matter (OSM) concentrations, that includes pathogenic bacteria, such as coliform bacteria, i.e. E.coli, (page 2, 14, 67, Figures 2.5, D4), wherein the measurements are obtained by Landsat TM satellite of Dutch lakes, (page 62).

Jamieson et al. (Canadian Biosystems Engineering, 2002, 44, 1.1-1.9) shows that Escherichia coli is the most common type of fecal coliform and with some strains being pathogenic and posing serious health risks to humans, (page 1.1, right column, second paragraph).

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Thorlabs (DET110-High-Speed Silicon Detector), 2002, 1-2, shows that a DET110 High-Speed silicon detector that has a spectral response between 320-1100nm, (page 2).

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-19 and 94-111 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-17 of U.S. Patent No. 7,132,254. Although the conflicting claims are not identical, they are not patentably distinct from each other because both inventions detect bacteria from light reflected off the surface of water using LANDSSAT TM band 3, 4 and 5 and encompass some of the same frequency ranges.

Claims 1-19 and 94-111 provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 18-43 of copending Application No. 11/499288. Although the conflicting claims are not identical, they are not patentably distinct from each other because both inventions detect bacteria from light reflected off the surface of water using LANDSSAT TM band 3, 4 and 5 and encompass some of the same frequency ranges.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Conclusion

No claim allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LARRY D. RIGGS II whose telephone number is (571)270-3062. The examiner can normally be reached on Monday-Thursday, 7:30AM-5:00PM, ALT. Friday, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marjorie Moran can be reached on 571-272-0720. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LDR/
Larry D. Riggs II
Examiner, Art Unit 1631

/Shubo (Joe) Zhou/
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Primary Examiner